

Piezo-Hydraulic Hybrid Pump for Flight Control, Phase I

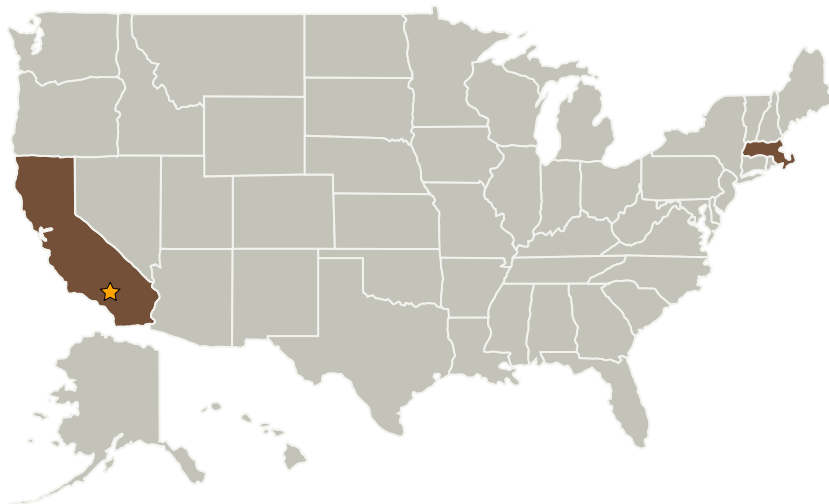
Completed Technology Project (2007 - 2007)



Project Introduction

Axis Engineering Technologies proposes a revolutionary new technology that can provide performance levels, in terms of output power, bandwidth and mass, previously unmet in current commercially available actuation platforms. The approach features a new hybrid pump, which is powered by active material stacks, and produces fluidic power to directly power hydraulic actuators. The compact, sealed unit eliminates external hydraulic components, such as accumulators, reservoirs, and, especially, long hydraulic tubing runs. By increasing system efficiency, reducing system mass and exploiting the unique characteristics of active materials, we expect to get a significant performance improvement in representative applications. This is in contrast with many commercially available actuation systems, composed of either traditional hydraulic or electromechanical mechanisms. Each of these systems is limited due to either excessive mass or limited bandwidth, or both. And yet these technologies have been adopted across a wide spectrum of applications, including Unmanned Aerial Vehicles (UAVs), high performance fighter aircraft, active automotive suspension systems and mobile robotic systems. Each of these applications would benefit greatly from the introduction of an actuation system that can provide mass-savings and bandwidth improvements, simultaneously.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Axis Engineering Technologies	Supporting Organization	Industry	Cambridge, Massachusetts

Primary U.S. Work Locations

California	Massachusetts
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.1 Cryogenic Systems
 - └ TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors